

## Reply on RC1

Collin J. Weber et al.

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Author comment on "Meso- and microplastic distribution and spatial connections to metal contaminations in highly cultivated and urbanised floodplain soilscares – a case study from the Nidda River (Germany)" by Collin J. Weber et al., SOIL Discuss., <https://doi.org/10.5194/soil-2022-1-AC2>, 2022

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Dear Reviewer 1 (RC1),

thank you for your time to read and comment on our manuscript! Thanks for the basic commendation and glad you liked the manuscript. Furthermore, thanks for the close look and your mention of the minor typos, which we will certainly correct. We would like to respond to some of the comments below and clarify open questions. For comments that only need to be implemented as a correction, we have set "[will be implemented during revision]".

Thank for your support. All the best,

Collin (on behalf of all co-authors)

### General comments:

Although the introduction was very informative it may benefit from being a little shorter.

- Thanks for this first general comment. We will shorten the introduction also in accordance with the community comment (CC1) to make it more precise.

### Specific comments:

I do not think it is necessary to refer to "(micro-)plastics" as they are in lines 11 and 12. Reference could just be made to "plastics" which would encompass plastics particles/pieces of all sizes.

- [will be implemented during revision]

Line 37: Do "physical processes" also include the role of biota in the fragmentation of plastics? Animals intentionally or unintentionally grazing on plastics results in fragmentation.

- Thanks for this comment and a good question as well. Didn't think about the role of biota for physical fragmentation of plastics. I think, so far this point wasn't also mentioned in current literature and is therefore perhaps not suitable for our

introduction by discussing this here.

Line 83: "In the Lahn River" should be "in the Lahn River"

- [will be implemented during revision]

There are several instances where "River" is not capitalised in the river name. This needs to be corrected in all instances through the manuscript.

- [will be implemented during revision]

Line 122: "enters" should be 'enter'.

- [will be implemented during revision]

Spaces before degree symbols should be removed. E.g. Line 134.

- [will be implemented during revision]

Spaces after '<' or '>' signs should be removed. E.g. Line 156 & 160.

- [will be implemented during revision]

Line 167: "result" should be "results".

- [will be implemented during revision]

Line 173: There is something wrong with the reference.

- Thanks for mentioning this point, but we couldn't find an error here. The reference in l. 173 is correct with "(Weihrauch, 2019)"

Line 177: "back swamp" should be "backswamp".

- [will be implemented during revision]

Line 199: it would be good if more information could be provided about the material the bags are made from. The definition of "bioplastic" can be variable, and misleading. For example, it can be used to describe a plastic made from a feedstock of biological origin (e.g. starch, not fossil fuel) however be a traditional polymer like PE, PVC; or alternatively it can be used to describe biodegradability. Care is taken in the methods to control for the presence of it in the sample by taking spectra, but I feel it would be good here to include a bit more information and make it clear what the polymer is.

- Special thanks for raising our attention to this point. The bags are made of corn starch and thus have a biological origin and are also "biodegradability" according EU norm (EN-13432). The exact manufacturing process is unfortunately not disclosed by the manufacturer (BioFutura B.V.), as it is a proprietary process (see website: <https://www.biofutura.com/de/rohstoffe/mater-bi>)
- We will change the information here and add the biological origin and biodegradability.

Line 202-3: Suggest rewording the sentence "Visible plastics fragments were collected on a 20 m<sup>2</sup> area around the drill points by walking straight lines with two persons (four-eyes-principle),....." to "Visible plastic fragments were collected in a 20 m<sup>2</sup> area around the drill

points, by two people walking straight lines in parallel (four-eyes-principle),.....”.

- [will be implemented during revision]

It would also be good to give dimensions of how the 20 m<sup>2</sup> area was obtained to show it was an equally distributed area around the central drill point.

- Thanks for this advice. We will add the following description within the revised version: “Surface sampling area was prepared by means of a tape measure and measuring rods, while a rectangle with the extension of 4x5 m was measured and marked around the centre (drill point)”

Line 212: Provide detail on what containers they were in for drying, or whether they were in the open bags.

- Details will be added: Samples were in open bioplastic bags within the closed drying chamber.

Line 202: I am not familiar with these standards and am unable to access them, however I feel that “loss of ignition” is not the right wording. Should it be combustion at 550°C until steady weight obtained?

- Thanks for this note. We think that “Loss of ignition” is the correct wording, as it’s the most widely used method for measuring soil organic matter (SOM) content.

Line 242: I am unfamiliar with ‘rim jars’. More detail needs to be given as to what they are made from.

- Details will be added: “... stored in rim jars made of glass with a PE-cap”

Line 254: space needed after  $\emptyset = \emptyset 47 \text{ mm}$  and  $\emptyset 90 \text{ mm}$

- [will be implemented during revision]

Line 258: It is not clear what “sprayer” is. Can more detail be given or a clear description of what this is?

- Thanks for this demand. May “sprayer” is a misleading wording. We used a “spray bottle” for this process and will change the wording to “spray bottle”.

Line 281: reword ‘for safety reasons’. I don’t think you mean it in the sense it reads. You are doing it to ensure that if any fragments of the bag have entered the sample you are able to account for this contamination and remove it from the analysis.

- Good advice, here. We will change the wording to “for contamination control through potential abrasion from the sample bags used”

Line 282: The use of cotton lab coats specifically avoids contamination of the air by synthetic fibres that would potentially come off synthetic lab coats. Contamination would still be still but they’d be cotton, and therefore not included in your analysis.

- Thanks for mentioning this point. We will add “... to avoid air contamination by synthetic fibres”

Line 357: Can you please provide information about what is included in your definition of “rubber” as this is a class or group of polymers, not a single type and it includes both fully

synthetic and semi-synthetic alternatives. This will also influence the EPO ages, with only the natural rubber being used in 1820s, and first synthetic rubber developed in 1910, and another alternative in the 1930s.

- Thanks for raising our attention to this point. The identification class "rubber" includes both fully synthetic rubbers as well as natural rubbers, based on the entries within the OpenSpecy FTIR spectra database. As we were already aware of this, the respective EPO ages were differentiated between natural and synthetic rubbers. We will add the respective information within the method section.

Line 366: The following sentence needs rewording "The plastics contain of HDPE ..." Is it meant to read "The plastics consists of HDPE..." Or "The plastics found included HDPE..."?

- Your right. The correct wording must be "The plastic consist of HDPE..." [will be implemented during revision]

Line 368: As this is intended for an intentional audience it may be best to avoid colloquial naming of things. Could 'fries fork' be changed to 'plastic fork', and 'DIY store shed' seems like a very broad category or description. Is there something more specific that can be said?

- Thank you for this important recommendation. We will change to "plastic fork" and "DIY store shed for flowers".

Line: 390: ', at depths below 100 cm.' is confusing. Is it meant that they are deeper, as in more >100 cm; or shallower? Please check and confirm to ensure it is less ambiguous.

- We will rephrase this part of the sentence to "deeper than 100 cm".

Line 426: It is not clear why 'Meso- and single macroplastic particles....' Is written like this. Can this be made clear, or changed to remove the 'single'?

- We will change the sentence to "Larger plastic particles within the macro- and mesoplastic size range, only occur isolated within topsoils (plough horizons) of sites.."

Line 448: What depths do "From 45.98% to 62.5%" refer to?

- Thanks for this comment. We will change to "from 45.98% in upper (0–50 cm) to 62.5% in lower (50–200 cm) soil layers."

Line 489: Change "Figure 8a and Figure 8b" to "Figure 8".

- [will be implemented during revision]

Line 536: Is this mislabelled? "Table T1". Should it be S1?

- Yes it is mislabelled. [will be implemented during revision]

Line 555: Change "incipient alteration surface structure" to "incipient alteration of surface structure".

- [will be implemented during revision]

Line 589: '(Table)' is this meant to be here?

- Table 2 is meant here. We will add the table number.

Line 682: Add "River" after "Nidda". Other occurrences like this may occur elsewhere in the document.

- [will be implemented during revision]

## Figures

**Figure 1:** Add in W (wastewater treatment plants) and ID (industrial discharge) in to the figure legend.

- [will be implemented during revision]

**Figure 2: a)** Both resin and rubber are broad categories of polymer. You should explain somewhere what is included within these definitions. See previous note about 'rubber'.

- Thanks again for this comment. We have answered already on the "rubber" note above and will add the additional information for "resins" within the method section.

The scale bars and associated distance in the photos need to be larger as they are currently impossible to read.

- [will be implemented during revision]

- **c)** It may be advantageous to add in labels of Course and Fine soil to the figure to make it clearer what the reader is looking at.

- [will be implemented during revision]

**Figure 3:** Adding Titles to the graphs would make it clearer what the reader is looking at. **a) & b)** both the y and x-axis labels need to be centred on the axes. **Legend:** Suggest rewording "(with transect site location and river km)" to "(with transect site location and river length (km))". This also needs to be changed in the axes labels. Add text to "dotted boxes indicate anthropogenic influence" = "dotted boxes indicate **sites exposed to anthropogenic influences**"

- Thank you for this kind recommendations. We will change the figure according them!

**Figure 4: y-axis label:** the '(-)' needs to be removed.

- [will be implemented during revision]

**Figure 5: x-axes labels:** the '(-)' needs to be removed from EF(-) and PLI(-).

- [will be implemented during revision]

**Figure 6:** it is not clear why for both **a)** and **b)** why the smaller particles are also presented as an additional graph inset as they are clearly presented in the total particles graphs. By removing them from both **a** and **b** the graphs showing all sized particles can widened.

- Thanks for this comment. Within Figure 6 the following problem occurred: When displaying the whole particle size, differences in the smaller size classes are hardly noticeable. Therefore the additional graphs for the smaller range. We will test the display again and revise it if reasonable.

**Figure 7:** the '(-)' needs to be removed from PLI(-). Can the circles for the floodplain positions be made larger so it is easier to see the different colours?

- [will be implemented during revision]

**Figure 8: y-axis** on both **a** and **b** need to be flipped around 180°. the '(-)' needs to be removed from EF(-).

- We will remove the '(-). Unfortunately, I do not understand why the y-axis should be flipped? Maybe you can give us a suggestion here?

#### **Tables:**

**Table S1:** a different footnote symbol for 'Shape' needs to be used as you also use 'a' to refer to a picture.

- [will be implemented during revision]

**Table 2:** It is not immediately clear what "low, moderate and high" are referring to. If they are referring to the Indices is it possible to change the format and have "low, moderate and high" right justified in the column?

- Of course this will be possible. We will change the format according your advice.

**Tables A1 and A2:** are referred to a lot. Could they go in the main body of the article rather than as an Appendix?

- Thank you for this suggestion. We think that both tables are too large and would disturb the reading flow of the paper, as they mainly contain important details, but are not necessary for the first access. Therefore, we would like to keep them as an appendix

**Table A1:** It was not clear to me why are some of the words in bold.

- Names of reference soil groups according WRB 2015 are in bold. We will add an explanation in the note at the end of the table